WHAT IS CLAIMED IS:

1. An actuator comprising:

a substrate extended in a predetermined direction;

a vibrating member supported on the substrate vibratably in the predetermined direction;

a vibration generating portion configured to vibrate the vibrating member in the predetermined direction;

a movable member having a first facing surface confronting the substrate and a second facing surface confronting the vibrating member;

a movable electrode disposed at any one of the first facing surface and second facing surface of the movable member; and

a counter electrode disposed on any one of the substrate and the vibrating member so as to confront the movable electrode, wherein

a potential difference is applied between the movable electrode and the counter electrode to cause an electrostatic force to act such that an apparent friction between the vibrating member and the movable member is greater than an apparent friction between the substrate and the movable member when displacing the vibrating member in a desired direction relatively on the substrate by vibrating in the predetermined direction, and thereby the movable member is relatively moved in the desired direction on the substrate.

2. The actuator according to claim 1, wherein a potential difference is applied between the movable electrode and the counter electrode to cause an electrostatic force to act such that an apparent friction between the substrate and the movable member is greater than an apparent friction between the vibrating member and the movable member, and thereby the movable member is stopped on the substrate.

3. The actuator according to claim 1, wherein the potential difference between the counter electrode and the movable electrode varies in synchronism with the vibration of the vibrating member.

4. The actuator according to claim 3, wherein a potential varying in synchronism with the vibration of the vibrating member is applied to any one electrode of the counter electrode and the movable electrode, and a fixed potential is applied to the other electrode.

5. The actuator according to claim 3, wherein there is a moment at which the potential difference between the counter electrode and the movable electrode becomes 0 in synchronism with the vibration.

6. The actuator according to claim 1, wherein a plurality of movable members each having the movable electrode disposed therein are provided, and the plurality of movable members move independently from each other.

7. The actuator according to claim 6, wherein

independent potentials are applied to the movable electrodes disposed in the plurality of movable members, whereby the plurality of movable members move independently from each other.

8. The actuator according to claim 6, wherein the movable members include optical elements.

9. The actuator according to claim 8, further comprising an optical element fixed to any one of the substrate and the vibrating member.

10. The actuator according to claim 1, wherein

the counter electrode is an electrode configured so that the area thereof facing the movable electrode varies depending on the position in the moving direction of the movable member, and

the position of the movable member is detected by making use of variation of the facing area.

11. The actuator according to claim 10, wherein the variation of the facing area is detected by measuring the electrostatic capacity between the counter electrode and the movable electrode.

12. The actuator according to claim 1, wherein

the counter electrode is an electrode divided into plural portions including a first region,

the first region has a shape such that the area facing the movable electrode changes depending on the position in the moving direction of the movable member, and

the position of the movable member is detected on the basis of the change in electrostatic capacity between the first region and the movable electrode.

13. The actuator according to claim 1, wherein the counter electrode is an electrode divided into plural portions including a first region and a second region,

the first region and second region each have a shape such that the area facing the movable electrode changes depending on the position in the moving direction of the movable member, and

the position of the movable member is detected on the basis of the change in ratio of electrostatic capacity between the first region and the movable electrode with respect to the electrostatic capacity between the second region and the movable electrode.

14. The actuator according to claim 1, wherein the vibration generating portion is configured of a piezoelectric vibrator which couples the substrate and the vibrating member.

15. The actuator according to claim 1, wherein the vibration generating portion includes:

an elastic member which couples the substrate and the vibrating member;

a first driving electrode disposed on the vibrating member; and

a second driving electrode which faces the first

driving electrode and disposed on the substrate so as to generate an electrostatic force in a desired direction, wherein

a potential difference is applied between the first driving electrode and the second driving electrode to cause an electrostatic force to act, thereby generating vibrations.

16. The actuator according to claim 1, wherein at least one surface of the counter electrode and the movable electrode is covered with an insulator.

17. An actuator comprising:

a substrate extended in a predetermined direction;

a vibrating member supported on the substrate vibratably in the predetermined direction;

a vibration generating portion configured to vibrate the vibrating member in the predetermined direction;

a movable member having a first facing surface confronting the substrate and a second facing surface confronting the vibrating member;

a movable electrode disposed at any one of the first facing surface and second facing surface of the movable member; and

a counter electrode disposed on any one of the substrate and the vibrating member so as to confront the movable electrode, wherein

a potential difference is applied between the

movable electrode and the counter electrode in synchronism with the vibration of the vibrating member, and by using the generated electrostatic force, the movable member is moved relatively on the substrate in a desired direction.

18. An actuator comprising:

a substrate extended in a predetermined direction;

a vibrating member supported on the substrate vibratably in the predetermined direction;

a vibration generating portion configured to vibrate the vibrating member in the predetermined direction;

a movable member having a first facing surface confronting the substrate and a second facing surface confronting the vibrating member;

movable electrodes disposed at the first and second facing surfaces of the movable member;

a first counter electrode disposed on the substrate so as to confront the movable electrode; and

a second counter electrode disposed on the vibrating member so as to confront the movable electrode, wherein

a potential difference is applied between the movable electrode and the first and second counter electrodes to cause an electrostatic force to act such that an apparent friction between the vibrating member and the movable member is greater than an apparent

friction between the substrate and the movable member when displacing the vibrating member in a desired direction relatively on the substrate by vibrating in the predetermined direction, and thereby the movable member is relatively moved in the desired direction on the substrate.

19. The actuator according to claim 18, wherein voltages mutually different in phase are applied to the first counter electrode and second counter electrode.

20. The actuator according to claim 19, wherein voltages mutually reverse in phase are applied to the first counter electrode and second counter electrode.

21. The actuator according to claim 18, wherein

the substrate is disposed at both sides of the vibrating member so as to enclose the vibrating member in a direction orthogonal to the vibrating direction of the vibrating member on the substrate surface, and

the first counter electrode confronting the movable electrode is disposed at both sides of the vibrating member.

22. A driving method of an actuator, the actuator including a movable electrode disposed on a movable member, and a counter electrode disposed at any one of a facing surface of a substrate having the facing surface confronting the movable member and a facing

surface of a vibrating member having the facing surface confronting the movable electrode and vibrating in a predetermined direction, applying a voltage to the movable electrode and the counter electrode, thereby causing the movable member to move relatively on the substrate, the driving method comprising:

displacing the vibrating member in a desired direction relatively on the substrate; and

applying a potential difference between the movable electrode and the counter electrode such that an apparent friction between the vibrating member and the movable member is greater than an apparent friction between the substrate and the movable member when displacing the vibrating member relatively.

23. A driving method of an actuator, the actuator applying a controlled voltage to a movable electrode disposed on a movable member, a first counter electrode disposed at a facing surface of the substrate having the facing surface confronting the movable electrode, and a second counter electrode disposed at a facing surface of the vibrating member having the facing surface confronting the movable electrode and vibrating in a predetermined direction, thereby causing the movable member to move relatively on the substrate, the driving method comprising:

displacing the vibrating member in a desired direction relatively on the substrate; and

applying a potential difference between at least the second counter electrode and the movable electrode when displacing the vibrating member relatively.